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ABSTRACT

This report presents an analysis of data used to evaluate Project CHILD (Curriculum to Heighten Intellectual and Language Development). The curriculum was designed for use with disadvantaged preschool children and was field tested in two schools in central Harlem, New York City. The objectives and methods of the curriculum, as well as background and characteristics of the four teachers involved in implementing the project are described. Two comparison groups were used in the evaluation, including afternoon classes of several experimental group teachers and a prekindergarten class in a nearby school. Data was collected for various aspects of the 1967-1968 program. It is emphasized that the curriculum attempted to achieve intellectual stimulation which would be reflected by playfulness with ideas, language, and learning strategies. These qualities are most difficult to assess with standardized measurement instruments. Evaluation incorporated the following data sources: (1) Peabody Picture Vocabulary Test (pre- and posttests), (2) Goodenough Draw-A-Man Test, (posttest only), (3) Levine Elzey Preschool Social Competency Scale, (4) teacher rankings on verbal competence and IQ. A separate analysis of speech and language needs is appended to the document. Results are inconclusive, and discussion focuses on limitations of the data due to difficulties in controlling many variables. (DP)

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DATA ANALYSIS, 1967-8

CUE Project - CHILD - Curriculum to Heighten Intellectual and Language Development: Disadvantaged Prekindergarten Children, Central Harlem, New York City.

by

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During the 1967-68 academic year, an experimental curriculum was implemented in four morning prekindergarten classes in two Central Harlem schools. Both schools were designated as "special service" by the New York City Board of Education, and both schools qualified for the Head Start type programs known locally as prekindergartens, based on incomes below poverty levels. These schools also qualified as serving economically disadvantaged and educationally retarded populations on all conventional scales, including unemployment rates, ratios of population living on welfare incomes, and reading achievement levels.

Summary of Experimental Curriculum

The experimental curriculum had these distinctive features:

1. It was a detailed, written statement which included weekly teaching plans, a weekly diagnostic check, listings of behavioral goals, concepts from selected content areas, and prototype teaching sequences which were called structure models.[3]

   a. Weekly teaching plans were furnished to teachers in duplicate, and one set was returned to the research staff with teacher notes on the number of items implemented that week, substitutions or omissions, and problems and achievements.

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b. A weekly diagnostic check was prepared to sample children's progress in specific learnings, as a base to initiate, to continue, or to extend patterned teaching.

c. Behavioral goals and root learnings were listed in seven selected content areas, that is, mathematics, science, music, language, sociology, geography and economics. Art activities were programmed for children's spontaneous selection and in connection with learnings in content areas.

d. Structure models were written in considerable detail to program teaching sequences, to order the levels of complexity and variation, and to relate teaching to individual progress.

2. It featured individual and small group instruction throughout the year, with a minimum of total group work, except in the musical sequences.

3. It featured simultaneous instructional activity by all adults in the classroom, in a variety of content areas.

4. It featured and valued forms of spontaneous playful learning as a goal to indicate children's assimilation of new concepts and skills.

5. It required respect for children's choices of activities and willingness to engage in structured learning.

6. It required a sequencing of learning activities in all areas from spontaneous playful learning to structured teaching, and then to independent playful elaboration or transformation.

7. It featured use of school materials and equipment, in addition to a selected supply of specialized materials, such as science materials, mathematics materials, cameras and tape recorders and props for dramatic play in specified content areas.

The model of teacher orientation and inservice training featured these attributes:

1. Weekly afterschool meetings were held with total teacher and research staffs.
2. Written program plans and structure models were distributed weekly and discussed with the teaching staff, and changes were made in these materials whenever the teaching staff agreed revision was needed. The weekly diagnostic checks were also distributed at this time.
3. Teachers were encouraged to suggest or develop alternative teaching sequences. They were asked to note such alternatives on their duplicate feedback sheets, returned to the research staff weekly.
4. New teaching sequences were discussed, demonstrated and practiced, and changed as needed.
5. New materials were distributed at these meetings and used in demonstration and role-playing.
6. Teachers discussed problems and progress during the preceding week, and the research staff wrote summaries of teacher feedback.
7. Administrative and supervisory school personnel, who were invited to all these meetings, occasionally attended.
8. A few total teacher and research staff meetings featured the study of videotapes made in experimental classrooms during the preceding week, or of transparencies showing varieties of experimental curriculum activities.
9. By teacher request, occasional lunch-hour meetings were held by research staff members with individual teachers or with the two teachers in one school, either on specific program aspects or to study videotapes in their classrooms.

10. Concern for parent understanding and cooperation with the curriculum goals were discussed with personnel in both schools. This resulted in research staff participation in planning for group parent meetings and preparation of duplicated material for distribution to parents. No systematic program of parent involvement was developed, but it is in future plans.

The experimental curriculum drew mainly on elements from:

1. Child development theory.
2. Linguistic theory.
3. Empirical studies of young children's classroom learning.
4. Curriculum developments in specific content areas.
5. Diagnosed learning needs of individual children.

The goals of the experimental curriculum did not include IQ changes, but featured intellectual stimulation, defined to mean children's assimilation of new learnings as evidenced by playfulness with ideas, language, and learning strategies. Specific behavioral goals included beginning reading and root learnings in seven selected content areas. Children's classroom experiences included self-selected play from specified alternatives, trips, group activities, and a great deal of individual and small-group structured activities. Structured activities were programmed in proto-type for teachers, in the form of structure models. Teachers were invited to improvise or change sequences as needed to advance the learnings of specific children toward selected behavioral goals. The development of game strategies by children, not only for immediate action, but also for planning ahead in the game, was a primary goal. The specific blueprint which was constituted by the weekly teaching plans and structure models featured the development of these game strategies in all content area activities.

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EXPERIMENTAL GROUP

Four teachers in two different schools in Central Harlem participated in the implementation of the experimental curriculum, but only with their morning classes. Three of the four teachers were Negro and one was white. Their experience in teaching young children ranged from none to twenty years. One teacher had previously taught older children and one teacher was beginning her teaching career. None of these teachers were taking college courses or in-service workshops during the year of their participation. Hence, their only source of academic stimulation was the research staff and that of the Project.

School I

School I is a comparatively new school located in central Harlem. Both prekindergartens are located on the ground floor near the main entrance and near the cafeteria which was used as auxiliary space during the morning sessions, as needed. One of the two prekindergarten classrooms had a built-in bathroom and sink. Although the second classroom had not yet been converted to prekindergarten requirements, the bathroom facilities were located directly across the hall, reducing inconvenience to a minimum. The administration in this school was supportive of the prekindergarten research project and responded helpfully to requests for space and materials. In addition, the assistant principal, who was supervisor of early childhood classes, attended several of the after-school meeting with the teachers

and the research staff. This was the second year of the research program in this school.

The parent program in School I included several daytime meetings with parents, of which the research team participated in two meetings at the request of the paraprofessional Family Assistant, whose job it was to provide liason between the school and the parents. The summary program descriptions which follow are based upon written and oral teacher feedback, weekly conferences, discussions at weekly meetings, in-class observations both written and on videotape, and an-end-of-year interview.

Teacher A

Teacher A was the only teacher who had worked with the project during its previous year of exploration and try out. Thus, unlike the other 3 teachers, she was able to anticipate some of the program's activities and to initiate them as early as she judged she could. In addition, Miss A had already found ways to change her style of teaching and her ideas about the program so that these were consistent with the considerable demands of the new program.

The early weeks of school were devoted primarily to helping children adjust to the school setting and to develop their skills of functioning within the class group. While the classroom was organized to offer the children choices, materials made available were limited to and centered in four interest areas, as suggested in the experimental program.

In addition to the emphasis on adjustment, Teacher A introduced a few structured activities from the experimental project during the early weeks. Miss A anticipated experimental programs quite early, primarily in language activities and in helping children develop concepts of "same" and "different". Miss A's trip program began the second

week of school and followed an orderly sequence, as suggested.

Miss A's previous year's experience with the project contributed to her ability to involve the teacher side more rapidly in the instructional program. The pattern of small group instruction was established early in the year, with both adults working simultaneously with small groups of children. Miss A not only followed the suggested project activities throughout the year, but she also expanded the program by featuring the desired learnings in many natural settings. As the children became increasingly interested and involved in structured activities the free choice activity period was gradually lengthened from forty-five minutes to one hour and fifteen minutes. The children's interest and increasing skill in the small group structured activities was accompanied by notable progress in their skills in interpersonal relationships and social behavior. Since less adult time was needed for guidance of social behavior the adults spent more time with individual children and in small groups in instructional games and activities. Teacher A preferred to work with small groups of 5-6 children rather then with individual children. She emphasized children's free choices and independence in learning activities. Based on her own description, a major accomplishment this year was the children's ability to select materials, become involved, sustain interest, request instructional help, and to choose and participate in structured play centers with as much involvement as in unstructured play centers.

Teacher B

Teacher B was new to the research project and to the school. She had previously taught older children. She was assigned to the prekindergarten two weeks after the class was formed, and spent the early weeks getting to know four-year-olds, the school procedures, and the curriculum plans

of the research project.

It took Miss B several weeks to develop classroom procedures which she perceived as providing a stable and orderly classroom schedule and flow of activities. Since she instituted the experimental program several weeks later than the other teachers, she introduced many project activities at the same time, instead of in the suggested sequences. To her surprise Miss B found that the focus on structured activity immediately diminished discipline problems and the need for continual guidance of social behavior. However, her lack of experience with young children was reflected in insecure and inconsistent handling of distractability, initial short attention span and undeveloped skills of social interaction.

Miss B had not previously developed a style for teaching four-year olds and therefore was extremely flexible in experimenting with suggested project activities. She quickly caught up to the other teachers in terms of the suggested sequence of activities and initiated variations readily.

In her attempt to find a workable schedule, Miss B experimented in scheduling during January. The free choice activity period was shortened and a half-hour structured activity period was introduced. This half-hour period included several activity centers, at tables with selected project materials in mathematics, science and language. The teacher and the teacher aide worked simultaneously with individuals and small groups of children, moving from group to group. After six to eight weeks of this the teacher felt that she was unable to offer the

instructional guidance needed for several structured activities at once Thus, the schedule was again altered to incorporate the project activities into the free choice activity period, which was lengthened to an hour and fifteen minutes. By spring Miss B was integrating project activities, such as store play, to include economics and mathematical and basic cognitive skills of classification.

Although the children learned to become involved in both structured and unstructured play centers, this group continued throughout the year to be easily over-stimulated. Miss B found it difficult to maintain a steady pace in developing curricular activities. Consequently, children in the group were differentially involved in project activities, a few children regularly and most on an irregular routine.

School 2

School 2 is an old three story building located in Central Harlem. The prekindergarten rooms are located two flights up from the main entrance. As in School 1, the administrative staff was supportive of the research project, though more pressed for time in this maximally enrolled school, and therefore less involved. Also as in School 1, the research staff participated in two meetings with parents, and used videotapes of classroom activities to illustrate the purposes and procedures of the project. The research project was starting its second year in this school, although the prekindergarten teachers were new to the school.

Teacher C

Miss C was the most experienced early childhood teacher, of the four teachers participating in the research program. Her extensive experience and fine reputation led to an assignment of a student teacher to this classroom for both the fall and spring semesters. The pace of her introduction of project activites was slow, as compared with the suggested

schedule and the other three teachers.

The early weeks of Miss C's program were devoted to helping children adjust to the school setting, to "feel comfortable" with adults, and to getting to know each child's individual personality pattern. In addition, since Miss C was new to the school, arranging the classroom to accommodate her own personal extensive collection of materials was a preoccupation for her during the early weeks.

As Miss C judged the children "ready", she gradually introduced the project activities, as an addition to her personal program. The pattern of adding project activities to an existing program continued into the winter months, which served to maintain the slow-paced introduction of new activities. By January, as the group developed interest and skill in the initial structured project activities, an increasing amount of time was devoted to the new features of the experimental program. Some aspects of Miss C's standard procedure were omitted to accommodate these new activities. For example, the block area was closed on alternate days for several weeks so that children could work in structured activities while adults were available to supervise these tasks. Similarly, the children's active interest and sustained involvement in project activities led to an intensive development of selected parts of the research program, primarily in patterning activities, science classification, name replication with alphabet letters, and listening to taped stories and nursery rhymes. Miss C valued these activities and felt that the children had progressed well during the course of the year. However, she reported that she felt the suggested pace of the research program was too fast.

Teacher D

Miss D was the only inexperienced teacher participating in the research program. She followed the weekly plans, initially, within the schedule recommended and reported that this guide was extremely valuable to her, as she was "so new to teaching."

By February as the groups and teacher had developed a pattern of functioning in the classroom, Miss D. preferred working with the total group and she dropped many of those research program activities that required individual or small group work. However, Miss D continued the research activities which were adaptable to total group instruction focusing considerable time on story dramatization and group games. Miss D tried to incorporate many of the suggested learning activities into the group games and she reported that she felt the children had learned many skills during the prekindergarten year including social skills, following directions recognition of numerals and counting. She also thought the children had considerably expanded their vocabularies.

COMPARISON GROUPS

Two comparison groups were tested. One group, designated Comparison Group II, consisted of the afternoon classes of two of the teachers involved in the experimental study with their morning classes. For these afternoon classes no requirements were made of the teachers with respect to any aspect of program implementation. The teachers did state that they pursued the same program, generally.

Comparison Group I consisted of the prekindergartens at a nearby school. A brief description follows.

School #3: Comparison Group I

When the school year began, School #3 was housed in Central Harlem in an old building which was scheduled to close as soon as a new building was completed. At this time, School #3 was designated as a standard "special service" school. As in many such schools, two pre-kindergarten classes were assigned with one teacher and a teacher aide. However, in addition, an educational assistant and a family worker were assigned as teaching personnel in each prekindergarten. Both classes met in large classrooms, the size of double kindergarten rooms.

At the end of October, School #3 was allotted one additional certified teacher for each prekindergarten, as part of an "Expanded Primary Program." Consequently, except for the first month, the pre-kindergartens were staffed with two certified teachers and a teacher aide, close to the staffing of the New York City More Effective Schools.* Additionally, an educational assistant was assigned until late January.

In March, the school moved across the street to its new quarters. The prekindergarten classrooms in the new building approximated the standard classroom designed for four-year-olds in New York City Schools. That is, facilities such as bathrooms and sinks are housed in the classroom, which has direct access to an enclosed school playground. The direct entrance to the school playground contributed to a change in program in both classes, to include outdoor play daily.

*The more effective schools have had three certified teachers and an aide assigned to each Prekindergarten class of fifteen children.

Attrition in School #3 was higher than in Schools 1 and 2, although the attendance record of children enrolled was approximately the same. School #3, unlike the other two schools, had one or two non-English speaking children enrolled in each prekindergarten class.

The parent program in School #3 included three prekindergarten parent meetings held during daytime hours. Parent attendance was low, with approximately 10 of the 50 parents present. Meetings were primarily devoted to describing the curriculum and providing workshop experiences for parents in the use of the curriculum materials.

The summary of program descriptions which follows is based primarily on teacher descriptions obtained in tape recorded interviews with the teachers. In addition, a few observational visits were made in each classroom to obtain a description of the program in action. Teachers in both classrooms stated that their curricular activities were developed in accordance with the Board of Education guide for programs in the prekindergarten. The teachers said that many of their ideas for activities were gained from this source.

The four prekindergarten teachers in school #3 constituted an unusually skillful group who were continuing their professional education and trying out in their own classrooms some of the ideas they were developing in their courses. For example, one teacher was taking an evening course in teaching reading to young children, which she happened to mention when observers noted her phonics lesson. She expressed satisfaction with the progress the children were making in this new teaching sequence. Another teacher who was taking a course in early cognitive development applied some of her new skills in instituting a

diagnostic check on some children in her group over a period of six weeks. A third teacher, who was observed teaching a well-developed musical program, indicated that she had considerable musical training, including study of the Dalcroze Method.

An additional impact on the curriculum in School #3, especially during the spring term was the active encouragement by the school administrator of a beginning reading program, including supplying Bank Street readers to the teachers. Although the teachers expressed some reservations about the reading emphasis, they had instituted some beginning lessons on reading, including name and word recognition, learning names of letters of the alphabet and emphasis on recognition of discrete words.

All four teachers in School #3 emphasized their valuing of total group instruction as an indication of attentional progress and readiness for structured learning. Programs in both classrooms which began with individual and very small group instruction, gradually changed to total group structured teaching.

Class A

Class A involved only 10 children at the beginning of the school year but increased to 14 by the spring. During the early weeks, the program was devoted primarily to helping children adjust to school routines and procedures. The daily schedule was as follows:

8:45 - 9:45	Free Choice Activity Period
9:45 -10:15	Bathroom and snack
10:15 -10:40	Physical games and songs
10:40 -11:00	Story

The four adults working in the classroom, a teacher, an aide, a family worker and an educational assistant, worked with individual

children and small groups. During the early weeks the children had a very short attention span. Hence, except for the physical games, activities were developed with individuals or small groups of two or three children.

The classroom had an adequate supply of standard prekindergarten equipment, set up in activity centers. Initially, the children were encouraged to explore and manipulate materials as they were taught procedures for care and use of materials.

By mid-November, as the children adjusted to the school routines, program emphasis shifted to the development of listening and speaking skills, and motor coordination. The physical games featured rhymes, object labels, labels of parts of the body and directional terms. The action games focused on vocabulary expansion while simultaneously providing the physical exercise the children needed. With the addition of one more teacher in November, the family worker was reassigned to non-teaching duties, leaving the same number of adults in the classroom as before.

Gradually, beginning in December, the duration of the free choice period was reduced. Additional total group activities were substituted such as finger plays, science activities, art activities and trips.

In January, the newly assigned second teacher was replaced, and by the end of the month, the educational assistant position was dropped, leaving 3 adults in the classroom. At this time the teachers became increasingly aware of the children's "poor" motor development as evidenced by an inability to skip and hop. A variety of physical games were included to offer children practice in developing coordination and motor skills.

In February, emphasis in working with concrete materials shifted to included representational materials for number work and vocabulary development. The numerals 1-9 were introduced as a group of representational figures, which the children were shown in a variety of settings. By mid-February, mathematics activities included comparing sizes of sets without counting, numeral recognition and labeling of geometric shapes. The science activities included discovering what objects float, and what objects sink, collecting various types of concrete objects for science collections and manipulation of varied textures in collage activities. The language development activities featured story listening in groups, and individually on tapes, vocabulary expansion through games, and story telling.

By early spring, the free choice activity period was reduced to one-half hour and additional time was allocated to more structured beginning reading activities with the total group. Name recognition, letter recognition and word recognition were featured with a variety of materials. Wall charts were used for language and mathematics, along with flannel board letters, numerals and shapes. A minimum of one-half hour daily was devoted to structured lessons in mathematics, pre-reading and early reading activities, with the total group.

The two teachers alternated responsibility for the instructional lessons with the total group, with the teacher and the teacher aide usually offering support in maintaining attentional levels. By late spring, the teachers emphasized the children's growing ability to express themselves by encouraging story telling by the children.

In assessing the year's program, the teachers expressed the feeling that the children had responded well to the curriculum. The teachers thought the children had developed markedly in their language skills of listening and expression, their number skills and concepts, pre-reading and early reading and in motor coordination and attention span. No changes in this curriculum were deemed necessary in the coming year, although additional materials were thought to be desirable.

Class B

In prekindergarten Class B enrollment increased from 12 at the opening of the school year, to 15 by spring. Initially, the program was devoted to helping children adjust to the school setting, including routines and procedures.

The early program schedule was as follows:

8:45 - 9:45	Free choice activity period
9:45- 10:15	Bathroom and snack
10:15 -10:35	Music
10:35 -11:00	Structured activity, such as number work, positional terms, and name labels

Story listening took place on a one-to-one basis during the free choice period. Early in November, when the additional teacher joined the program, a diagnostic assessment procedure was initiated with half the group. The content of this assessment included terms of spatial relationship, size, color, geometric shape and the concept of same and different. This check of children's progress was initiated by the new teacher as a part of a course assignment her local college gave her.

The information gained from the diagnostic check influenced the curriculum plans, leading to emphasis on the areas which had been assessed. After six weeks of intensive instructional activity in small groups and total group, the teacher again administered the diagnostic assessment and found the children had progressed "well". This procedure of diagnosing progress was not reported, although the teacher viewed it as valuable and planned to try it again the following year. Instructional activity took place primarily on an individual and small group basis initially, with the groups becoming larger in December and January. Total group instruction expanded to include mathematical games, numeral recognition, counting, language labels of color, object names and descriptive vocabulary.

The class was divided into two groups for story listening early in the year. Later the two groups became one. Vocabulary expansion was introduced into a variety of activities including music, games and story listening. During the activity period the teachers worked with individual children and in small groups, primarily on pre-reading activities and beginning number work.

By spring the teachers placed a strong emphasis on early reading, including name recognition, alphabet letter names and work recognition. Wall charts and printed object labels were clearly in evidence in the room. The teachers reported that they were hesitant to pursue the structured pre-reading and early reading activities despite the encouragement of the school administration and parents. However, teachers indicated some of the children responded well to these activities.

In reviewing the year's activities, these two teachers felt that the major accomplishments with the children were as follows:

1. Children became more trusting of the adults.
2. Children developed expanded concepts in materials and science.
3. Children enjoyed stories.
4. Children developed social skills needed for functioning within a school group.
5. Children increased their ability to produce language; that is the children talked a great deal more than they did at the beginning.

The teachers in this classroom expressed a strong feeling that more varied materials and a greater number of materials are needed in their classroom.

DATA SOURCES

The goal of the experimental curriculum was intellectual stimulation, defined to mean children's assimilation of new learnings as evidenced by playfulness with ideas, language and learning strategies. Evaluation of a program with such a goal has been difficult, since satisfactory tests are non-existent. Efforts are being made to devise additional ways to evaluate the program's goals for the 1968-69 year's implementation.

Data were collected on various aspects of the 1967-68 program, both on teacher use of the curriculum design and effects on children. This report is confined to data about the children's progress in school, since teacher use of the curriculum has been summarized elsewhere.[5]

Data could not be secured for all children due to children's absences, and problems of adjusting tests to teacher obligations and classroom problems. The following scores were secured:

Peabody Picture Vocabulary Tests, Pretests and Postests

Goodenough Draw-A-Man, postest only

Levine Elzey Preschool Social Competency Scale

Teacher Ranking of Children on Verbal Competence and I.Q.

A separate analysis of speech and language needs is appended, prepared by Professor Seymour Rigrodsky and Dr Eleanor Morrison, of the Department of Speech Pathology at Teachers College, Columbia University.

DATA ANALYSIS

Table I shows the PPVT I.Q. scores and posttest standard scores on the Goodenough Draw-A-Man test. Scores are almost identical on the PPVT for the experimental group and comparison group I in the school with double teacher staffing. While posttest I.Q. scores of 86 are not high, they represent increases of 15 points over pretest scores. The experimental group outscored the same comparison group on the Goodenough Draw-A-Man test with standard scores of 87 compared with 82 although the significance of this discrepancy is not readily apparent.

If the children in the experimental groups are compared with two of the afternoon classes in the same schools, with the same teachers, that is Comparison group II, the results probably suggest a more realistic comparison of the possible effects of the program. Comparison group II shows up poorly on the PPVT as well as the Goodenough Draw-A-Man test,

with scores below 80 for both. Interpretations of these findings require great caution, since the numbers are small and there are so many uncontrolled factors in thsi situation. For example, Comparison Group II has a lower mean pretest IQ on the PPVT and this may suggest that in fact, it was a less able group. Equally or more tenable explanations could be teacher fatigue and poorer social skills compared with more rested morning children.

There was little variation in age among the groups as shown on Table 2, with all means within a month of 50 months, as of October 1, 1967, or four years and two months. Standard deviations were consistently small. Figures presented separately on Table 2 for each of the four experimental classes show interesting differences among them. Class 1 had the only teacher who was working with the research team for a second year and her class outscored all the others, reaching a mean posttest IQ score in the PPVT of 91.9 and a standard score, which is an IQ equivalent, on the post Draw-A-Man test of 98.1. If superior scores in this group are a function of greater teacher expertise in implementing a new curriculum, it would provide ground for optimism that children's average performance in school could be considerably improved through effective teacher training.

Table 2 indicates that two of the four experimental classes had net IQ changes on the PPVT of 19.3 points, a very substantial change. Despite these large increases, Class 3 had a posttest mean of only 83.8 compared with 91.9 for Class 1. Class 1 also achieved a mean post score on the Goodenough Draw-A-Man test of 98.1 compared with 74.6 for Class 2,

84.5 for Class 3 and 89.0 for Class 4. Comparable scores were 82 for Comparison group I and 76.3 for Comparison group II.

The Draw-A-Man posttest afforded testers amusement when a child completed this test with an obviously low score but insisted on writing his full name on the test page for which no credit is given. Scorers also noted the test's bias against credit for children's drawing of genital features, in favor of details of clothing.

Attendance figures were unexpectedly good. Four-year-olds are generally expected to lose a substantial proportion of school time because of colds and infectious diseases, but all groups appeared to be averaging attendance approaching 90 percent of the time, at least through May 1, 1968, as shown on Table 13. Since infectious diseases once introduced into a group, may be responsible for absences right through the end of June, these figures may overstate attendance. However, in each group, it was noted, most children attended very regularly, with two or three children responsible for most periods of absence.

Correlation matrices, summarized on Table 3 offer several surprises in the unexpectedly negative correlations of teacher ranking compared with ranking on standardized tests. Teachers of young children are generally regarded as being better able to predict children's chances for school success than test scores. But interpretation is difficult where teacher ranking correlates negatively with test scores, as it

happened in two of the experimental classes. Percent attendance correlated with post IQ on the PPVT in only one class. In this class, percent attendance and social competence were positively correlated, as one would expect, but negative correlations occurred for percent attendance with IQ rank on the PPVT posttest and with teacher ranking, both in verbal competence and IQ. In the other three experimental classes, attendance did not correlate significantly with any scores. Since the teachers scored social competency as well as rank on verbal competence and presumed IQ, the generally high, but negative correlations between social competency scores and teacher ranking on verbal competence and IQ, raises questions about the bases for teacher scoring of children's behavior and their personal reactions to "competent" children.

In Class 3 of the experimental group, there was a positive significant correlation between the D-A-M standard scores and the teachers' ranking of the children on verbal competence but not on her ranking of presumed IQ. In Class 1, a negative correlation was established between the D-A-M and the Teachers' ranking of presumed IQ. Detailed correlation matrices for each class and for sub-groups are given on Tables 4 through 12. Tables 5 and 7, for males and females respectively, in the experimental classes, indicate significant correlations for boys, but not for girls, between social competence scores and post IQ scores on PPVT and between social competence scores and post scores on the Draw-A-Man test.

For all four experimental classes combined, significant correlations are shown on Table 4 between percent attendance and social competence, between the post IQ on the PPVT and the standard score on the Goodenough Draw-A-Man test, and between the post IQ-PPVT and the IQ change on the PPVT. Thus the higher scorers on the PPVT were also, to a significant extent the high scorers on the D-A-M and those who achieved the largest net IQ changes on the PPVT. This would be an interesting result if replications support it, since regression to the mean effect would chiefly involve increasing low scorers to scores more reasonably representative of their actual ability. Other significant correlations are shown between social competence and percent attendance and between social competence and the D-A-M standard scores.

Sex differences were generally narrow, as shown on Table 14 and chiefly favored the boys, when experimental and comparison groups are combined. The girls outscored the boys, combining all groups, only on the Draw-A-Man posttest. Since drawing requires considerable eye-hand coordination, this test may reflect relatively greater physical maturity for girls.

However, if boys and girls are compared, for the experimental classes only, girls' scores show only one significant correlation on Table 6 between post PPVT - IQ and IQ change on PPVT. Boys' scores show positive significant correlations on Table 5 between social

competence, on the one hand, and a tendency, post IQ-PPVT and post G-A-M standard scores, on the other. Combining three of the four experimental classes, for which social competence scores were available, Table 13 indicates practically no differences on means, between boys and girls, except for social competence scores and the size of the PPVT-IQ net change. On these items, girls were favored, scoring a mean of 88.7 on social competence, compared with 79.2 for boys, and a net IQ change of 13.7 compared with 14.5 for boys. Despite these advantages, boys scored slightly but not significantly, higher than girls on the posttests on the PPVT-IQ and the G-A-M.

Further light on the distribution of scores is offered on Table 15. It is interesting to note that 32 of the 55 children, or almost 60 percent, in the experimental group scored 80 or above on the PPVT-posttest IQ. The "uncorrelle" scores, pulling means down to 8[illegible], tend to obscure the fact that the majority of the children in these classes wound up well within the range of normal IQ. The high score on the posttest was 110 in the experimental group, 114 in Comparison-group I and 106 in Comparison group II. In Comparison group I, 12 out of 23 children, or close to 50 percent, scored at 90 or above on the PPVT posttest-IQ. Comparison group II had only 10 children, or about 44 percent, scoring at 90 or above on this test.

On the Goodenough Draw-A-Man posttest, high standard scores, regarded as IQ equivalents, were 13[illegible] in the experimental group, 110 in Comparison-group I and 111 in Comparison group II. [illegible] experimental group and

13 children, or 23 percent of the total, scoring at 100 or above. The comparable percentages were 13 percent in Comparison group I and only one child or 4 percent in Comparison group II.

LIMITATIONS OF THE DATA

Dealing with small numbers of children and teachers in realistic situations which offer very few possibilities for control, data can only be offered with great caution. Some of the cautions can be specified, such as the following:

1. Experimental classes are in no sense randomly selected nor is there a control group in the generally accepted meaning of this term. The nature of this curriculum design requires use of intact classes. Bringing the curriculum into being on an experimental basis required considerable voluntary cooperation of a district superintendent, several public school principals and assistant principals and the prekindergarten teachers and paraprofessionals. Comparison data are used solely for contrast to gauge possible directions and extent of change.
2. The Peabody Picture Vocabulary Test, presented here in pretest and posttest scores, has been considered by many researchers who have used it extensively, as an inefficient test of verbal IQ with strong bias against populations of Negro children. It tests a very narrow band of verbal skills, attentional ability and ability to understand the tester's verbal explanations and directions. Its most important bias may be the relatively

non-urban content selected, since so many of the pictures presented to the children represent objects with which urban children would usually have less familiarity than rural children. Its white Mid-west norming population may make it more regionally than nationally appropropiate. The use of this test is often dictated by expediency, that is, it is short, easy to administer and score and easy to compare with the norm.

3. Scoring the PIVT presents problems which are seldom shared outside of research staffs. Children may score in the "unscorable" range, with very low assigned scores, such as an IQ of 45. This happens more often on pretests than posttests, with younger rather than older children and with children who are anxious or frightened and unable to respond spontaneously. Spuriously low pretest scores must contribute some important bias to net IQ changes from pretest to posttest. When apparently normal four-year-old children score at mental age levels of two-year-olds, test results must be viewed with suspicion. Scores in the low age ranges also result in unexpectedly large numerical differences for very small differences in responses.

4. Reliability of young children's responses to test situations is notoriously poor and subject to untold vagaries. In most classes, children were willing and eager to be tested but in one class, Comparison group I, high anxiety was noted and refusals were received and accepted, especially on the pretest.

5. In one school with two experimental classes, the highly experienced teacher offered to select for her own group those children with obvious problems, in order to assist the new teacher in the other class to organize her group more easily. Lower IQ scores in the former class, compared with the latter, may only reflect the higher incidence of school adjustment problems and the children's lack of ability to make requested test responses.

6. Cause and effect relationships are not assumed between program and children's scores, because of the lack of random sampling and numerous and varied uncontrolled elements in each class and school. Scores are viewed as feedback and clues to possible changes.

7. The Goodenough Draw-A-Man test, which was given only as a posttest and not as a pretest, is regarded by many researchers as a "non-verbal" IQ measure. It is no more nonverbal than the PPVT, neither of which require children's verbal responses. In both cases, children make a physical response, in the PPVT by pointing and in the D-A-M by a pencilled drawing. The latter is a factor of eye-hand coordination and small muscle control in addition to verbal comprehension of the task. Both tests require children's understanding of testers' verbal directions which may be very difficult for many Negro children, in addition to attentional skill.

The scoring bias in the Draw-A-Man test seems to be in favor of details of clothing items rather than of physical features, especially in the genital area.

8. Testing young children in some school situations turned out to be frustrating because of lack of appropriate space, existence of distractions which could not be removed and negative school attitudes to testing.

9. The Levine-Elzey Preschool Social Competency Scale was scored by three teachers, who were paid for the time spent in scoring. The fourth teacher in the experimental program failed to return her scores. The scale requires teachers to score children's behavior but does not require any data sources as a base. Research team members who reviewed these scores indicated many problems of interpretation of teacher's scoring. It seems probable that teachers can use this kind of scale to distinguish between extremes of behavior but finer distinctions create many problems.

10. Each teacher was asked to make two independent rankings of children in her class, one based on teacher judgment of verbal competence, one on teacher presumption of IQ. When this request was discussed with teachers, many questions came up, such as whether verbal competence meant talkativeness, or unusual vocabulary and how verbal competence differs from IQ. Teacher rankings were made but there must have been other confusions which were not raised.

Footnotes

1
This publication results from work performed under a contract with the United States Department of Health, Education and Welfare, Office of Education, via the Center for Urban Education, New York City.

2
I am greatly indebted to Dr. Sydney Schwartz, Research Associate on this study during the past three years, without whose assistance the project could not have continued.

3
Research assistants who have contributed to the study, include David Wickens, Sylvia Ross and Irene Slaymaker. Dr. Kenneth Wann, formerly Professor of Education at Teachers College, Columbia University, was a co-principal researcher in the study from its inception in 1965 until June 1967. The teachers, teacher aides, supervisors and principals who supported the project constitute the important group of people who brought the project to life. The study owes a debt of gratitude to Dr. Nathan Jacobson, District Superintendent for District 5, New York City Board of Education, for his cooperation and support of this study, and to Mrs. Naomi Hill, District Early Childhood Supervisor.

4
Educational assistants and family workers are terms used for paraprofessional personnel in New York City schools. The former are usually required to have completed two years of college education and assist the teacher in the classroom. The family worker may be a high school graduate and is usually assigned to work outside the classroom, in liason with families of prekindergarten children, attempting to identify family problems and to expedite solutions where possible.

5
Study of Intellectual Stimulation of Disadvantaged Prekindergarten Children: Status Report, Helen F. Robison, Principal Researcher, Teachers College, Columbia University, June 30, 1968.

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Table No. 1

Experimental and Two Comparison Prekindergarten Groups:
Mean scores on pretests and posttests - Peabody Picture Vocabulary Test and posttest on Goodenough Draw-A-Man Test.

	Group		
	Experimental n=55[1]	Comparison Group I n=24[2]	Comparison Group II n=23[3]
Scores:			
PPVT			
1. Pretest IQ	70.9	69.5	67.4
2. Posttest IQ	86.0	85.6	78.3
3. IQ Change	14.9	16.1	10.9
Goodenough Draw-A-Man Posttest Standard Score	87.4	82.0	70.2

[1] Morning classes of 4 teachers in 2 schools in Central Harlem, staffing of 1 teacher and 1 teacher aide to a class of 19 four-year-old children.

[2] Children in different school in Central Harlem in an "Enriched Primary Program", with staffing similar to More Effective Schools, that is, certified teachers and 1 teacher aide to a class of 19 four-year-olds.

[3] Children not in experimental treatment in afternoon classes of 2 teachers with experimental morning classes.

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Table No. 2

Experimental and Comparison Prekindergarten Groups: Means and standard deviations, by age in months as of 10-1-67, percent attendance, IQ scores on PPVT-pretest, posttest and IQ change, standard score on Goodenough Draw-A-Man posttest and social competence posttest.[1]

Group	Experimental Group					Comparison Group I	Comparison Group II[2]
		Class					
Variable	Total	1	2	3	4		
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Age in months as of 10-1-67							
Mean	50.8	50.	50.9	50.7	51.9	50.9	51.
SD	3.9	3.2	.5	4.1	3.2	3.8	4.
N	99	15	14	13	13	24	23
Percent attendance							
Mean	75.8	79.0	83.3	72.1	80.1	84.8	
SD	14.2	17.3	11.4	14.4	11.3	9.9	
N	99	15	14	13	13	24	
PPVT-pretest							
Mean IQ	70.9	72.6	74.1	64.3	71.7	69.2	69.4
SD	16.7	20.1	16.1	13.1	16.7	15.9	19.1
N	99	15	14	13	13	24	23
PPVT-posttest							
Mean IQ	85.8	91.9	83.1	85.8	83.9	89.0	78.3
SD		19.6	21.3	17.3	17.1	16.3	19.1
N		15	14	13	13	24	23
PPVT-IQ change from pre- to posttest							
Mean	14.9	19.	9.0	19.3	11.8	19.1	8.
SD	15.2	13.0	14.8	17.3	11.7	16.7	21.2
N	99	15	14	13	13	24	23
Goodenough D-A-M posttest							
Mean Std. Score	87.4	98.1	74.6	84.3	89.0	82.0	79.
SD		20.1	9.6	20.6	18.6	18.0	11.3
N		13	10	11	13	24	20
Social competence posttest							
Mean	83.7	87.1	--[3]	79.0	83.4	--[3]	--
SD	16.9	13.3	--	16.1	19.3	--	--
N	41	15	0	13	13	0	0

[1]Social competence test used was Levine-Elkey Preschool Social Competency Scale.

[2]Children not in experimental treatment, in afternoon classes of teachers with experimental morning classes.

[3]No scores for this group available.

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Table No. 3

Experimental Classes:

Summary of significant correlations, positive and negative among variables, 1967-68, 4 classes, 2 schools in Central Harlem, New York City.

Variables	Classes 1		2		3		4	
	Sign Corr	Corr Coef	Sign Corr	Corr Coef	Sign Corr	Corr Coef	Sign Corr	Corr Coef
1. Attendance								
a. Post IQ-PPVT	yes	.540	no		no		no	
b. Standard Score-D-A-M	no		no		no		no	
c. Social Competence	yes	.575	--		no		no	
d. Teacher Ranking-Verbal	yes	-.765	no		no		no	
e. -IQ	yes	-.757	no		no		no	
f. IQ Rank-Posttest-PPVT	yes	-.566	no		no		no	
g. IQ Change-PPVT	no		no		no		no	
2. Post IQ - PPVT								
a. Standard Score-D-A-M	no		no		no		no	
b. Social Competence	yes	.739	--		no		no	
c. Teacher Ranking-Verbal	yes	-.655	no		no		no	
d. -IQ	yes	-.833	no		no		no	
e. IQ Rank-Posttest-PPVT	yes	-.977	yes	-.974	yes	-.977	yes	-.938
f. IQ Change-PPVT	no		yes	.638	yes	.720	no	
3. Standard Score- D.A-M								
a. Social Competence	no		--		no		no	
b. Teacher Ranking-Verbal	no		no		yes	.640	no	
c. -IQ	yes	-.640	no		no		no	
d. IQ Rank-Posttest-PPVT	no		no		no		no	
e. IQ Change-TPVT	no		no		no		no	
4. Social Competence								
a. Teacher Ranking-Verbal	yes	-.661	--		no		yes	-.677
b. -IQ	yes	-.762	--		yes	-.870	yes	-.684
c. IQ Rank-Posttest-PPVT	yes	-.747	--		no		no	
d. IQ Change-PPVT	no		--		no		no	
5. Teacher Ranking-Verbal								
a. Teacher Rank-IQ	yes	.689	yes	.830	no		yes	.702
b. Standard Score-D-A-M	no		no		yes	.680	no	
c. IQ Rank-Posttest-PPVT	yes	.620	no		yes	-.771	yes	.632
d. IQ Change-PPVT	no		no					
6. Teacher Ranking-IQ								
a. Standard Score-D-A-M	yes	-.640	no		no		no	
b. IQ Rank-Posttest-PPVT	yes	.820	no		no		no	
c. IQ Change-PPVT	no		no		no		yes	.719
7. IQ Rank-Posttest-PPVT								
a. Standard Score-D-A-M	no		no		no		no	
b. IQ Change-PPVT	no		yes	-.783	yes	-.719	no	

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Table No.4

Experimental Classes:
Correlation matrix, five variables -- percent attendance, post IQ score-PPVT, post standard score on Goodenough Draw-A-Man, social competence score, IQ change-PPVT -- 4 classes combined, 1967-68, Central Harlem, New York City.[1]

Variable	1. Percent Attendance	2. Post IQ PPVT	3. Post Standard Score, Draw-A-Man	4. Social Competence Score	5. IQ Change PPVT
1. Percent Attendance	1.000	.113	.120	.346*	.092
2. Post IQ - PPVT	.113	1.000	.359*	.263	.533*
3. Post Standard Score, Draw-A-Man	.120	.359*	1.000	.380*	.162
4. Social Competence Score	.346*	.263	.380*	1.000	-.006
5. IQ Change-PPVT	.092	.533*	.162	-.006	1.000

*significant at standard z values greater than 1.96, if Alpha is .05.

[1] n varies, from 37 to 55, depending on availability of scores.

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Table No. 5

Experimental Classes:
Correlation matrix, five variables -- percent attendance, post IQ score-PPVT, post standard score on Goodenough Draw-A-Man, social competence score, IQ change-PPVT -- 4 classes combined, males, 1967-68, Central Harlem, New York City.[1]

Variable	1. Percent Attendance	2. Post IQ PPVT	3. Post Standard Score, Draw-A-Man	4. Social Competence Score	5. IQ Change-PPVT
1. Percent Attendance	1.000	.117	.016	.457*	-.073
2. Post IQ-PPVT	.117	1.000	.618*	.492*	.481*
3. Post Standard Score, Draw-A-Man	.016	.618*	1.000	.589*	.371
4. Social Competence Score	.457*	.492*	.589*	1.000	.176
5. IQ Change-PPVT	-.073	.481	.371	.176	1.000

*significant at standard z values greater than 1.96, if Alpha is .05.

[1] n varies, from 20 to 27, depending on availability of scores.

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Table No. 6

Experimental Classes:
Correlation matrix, five variables -- percent attendance, post IQ score-PPVT, post standard score on Goodenough Draw-A-Man Test, social competence score, IQ change-PPVT--4 classes combined, females, 1967-68, Central Harlem, New York City.[1]

Variable	1. Percent Attendance	2. Post IQ PPVT	3. Post Standard Score, Draw-A-Man	4. Social Competence Score	5. IQ Change-PPVT
1. Percent Attendance	1.000	.106	.262	.197	.266
2. Post IQ-PPVT	.106	1.000	.078	.020	.600*
3. Post Standard Score, Draw-A-Man	.262	.078	1.000	.199	-.051
4. Social Competence Score	.197	.020	.199	1.000	-.353
5. IQ Change-PPVT	.266	.600*	-.051	-.353	1.000

*significant at standard z values greater than 1.96, if Alpha is .05.

[1] n varies from 17 to 28, depending on availability of scores.

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Table No. 7

Comparison Group I:

Correlation matrix, four variables -- percent attendance, post IQ score-PPVT, Post standard score on Goodenough Draw-A-Man Test, IQ change-PPVT -- total group, 1967-68, Central Harlem, New York City, n=24.

Variable	1. Percent Attendance	2. Post IQ-PPVT	3. Post Standard Score, Draw-A-Man	4. IQ Change-PPVT
1. Percent Attendance	1.000	.126	.193	-.080
2. Post IQ - PPVT	.126	1.000	.454*	.543*
3. Post Standard Score, Draw-A-Man	.193	.454*	1.000	.317
4. IQ Change-PPVT	-.080	.543*	.317	1.000

*significant at standard r values greater than 1.96, if Alpha is 0.5.

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Table No. 8

Comparison Group II

Correlation matrix, four variables -- percent attendance, post IQ PPVT, post standard score on Goodenough Draw-A-Man Test, IQ change-PPVT--males, 1967-68, Central Harlem, New York City, n=13.

Variable	1. Percent Attendance	2. Post IQ-PPVT	3. Post Standard Score, Draw-A-Man	4. IQ Change-PPVT
1. Percent Attendance	1.000	-.032	-.232	.068
2. Post IQ - PPVT	-.032	1.000	.413	.677*
3. Post Standard Score, Draw-A-Man	-.232	.413	1.000	.218
4. IQ Change-PPVT	.068	.677*	.218	1.000

*Significant at standard z values greater than 1.96, if Alpha is .05.

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Table No. 9

Experimental Group, Class 1:
Correlation matrix, eight variables, 1967-68, Central Harlem, New York City.[1]

Variable[1]	1. Percent Attendance	2. Post IQ - PPVT	3. Standard Score - Draw-A-Man	4. Social Competence Score	5. Teacher Ranking - Verbal Competence	6. Teacher Ranking - IQ	7. IQ Rank - Posttest PPVT	8. IQ Change - PPVT
1. Percent Attendance	1.000	.520	.226	.579*	-.769*	-.757*	-.566*	.168
2. Post IQ - PPVT	.520*	1.000	.488	.739*	-.655*	-.833*	-.977*	.349
3. Standard Score - Draw-A-Man	.226	.488	1.000	.508	-.552	-.640*	-.455	.003
4. Social Competence Score	.579*	.739*	.508	1.000	-.661*	-.762*	-.747*	.392
5. Teacher Ranking - Verbal	-.769*	-.655*	-.552	-.661*	1.000	.889*	.620*	-.311
6. Teacher Ranking - IQ	-.757*	-.833*	-.640*	-.762*	.889*	1.000	.820*	-.237
7. IQ Rank - PPVT	-.566*	-.977*	-.455	-.747*	.620*	.820*	1.000	-.373
8. IQ Change - PPVT	.168	.349	.003	.392	-.311	-.237	-.373	1.000

[1]All scores are post-scores, for 13 to 14 children.

*significant at standard r values greater than 1.55, if Alpha is .05.

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Table No. 10

Experimental Group, Class 2:

Correlation matrix, seven variables, 1967-68, Central Harlem, New York City.[1]

Variable[1]	1. Percent Attendance	2. Post IQ - PPVT	3. Standard Score - Draw-A-Man	4. Teacher Ranking - Verbal Competence	5. Teacher Ranking - IQ	6. Posttest IQ Rank - PPVT	7. IQ Change - PPVT
1. Percent Attendance	1.000	-.175	-.278	-.184	-.019	.158	.193
2. Post IQ - PPVT	-.175	1.000	-.370	.177	.048	-.974*	.658*
3. Standard Score - Draw-A-Man	-.278	-.370	1.000	-.106	-.184	.449	-.172
4. Teacher Ranking, Verbal Competence	-.184	.177	-.106	1.000	.850*	-.203	.053
5. Teacher Ranking - IQ	-.019	.048	-.184	.850*	1.000	-.099	.112
6. Posttest IQ Rank - PPVT	.158	-.974*	.449	-.203	-.099	1.000	-.726*
7. IQ Change - PPVT	.193	.658*	-.172	.053	.112	-.726*	1.000

[1]All scores are post-scores, for 10-14 children.

*significant at standard z values greater than 1.96, if Alpha is .05.

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Table No. 11

Experimental Group, Class 3:

Correlation matrix, eight variables, 1967-68, Central Harlem, New York City.[1]

Variable[1]	1. Percent Attendance	2. Post IQ - PPVT	3. Standard Score - Draw-A-Man	4. Social Competence Score	5. Teacher Ranking - Verbal Competence	6. Teacher Ranking - IQ	7. IQ Rank - Posttest PPVT	8. IQ Change - PPVT
1. Percent Attendance	1.000	.076	.038	.399	-.115	-.250	-.038	.331
2. Post IQ - PPVT	.076	1.000	.396	-.021	.552	-.040	-.977*	.720*
3. Standard Score - Draw-A-Man	.038	.396	1.000	.252	.648*	-.270	-.440	.329
4. Social Competence Score	.399	-.021	.252	1.000	-.310	-.870*	-.050	.184
5. Teacher Ranking - Verbal	-.115	.552	.648*	-.310	1.000	.120	-.571*	.411
6. Teacher Ranking - IQ	-.250	-.040	-.270	-.870*	.120	1.000	.126	-.248
7. IQ Rank - PPVT	-.038	-.977*	-.440	-.050	-.571*	.126	1.000	-.715*
8. IQ Change - PPVT	.331	.720*	.329	.184	.411	-.248	-.715*	1.000

[1] All scores are post-scores, for 11-13 children.

*significant at standard z values greater than 1.96, if Alpha is .05.

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Table No. 12

Experimental Group, Class 4:
Correlation matrix, eight variables, 1967-68, Central Harlem, New York City.[1]

Variable[1]	1. Percent Attendance	2. Post IQ - PPVT	3. Standard Score - Draw-A-Man	4. Social Competence Score	5. Teacher Ranking - Verbal Competence	6. Teacher Ranking - IQ	7. IQ Rank - Posttest PPVT	8. IQ Change - PPVT
1. Percent Attendance	1.000	-.218	.449	-.132	.160	.195	.095	-.098
2. Post IQ - PPVT	-.218	1.000	.139	.054	-.058	.177	-.938*	.374
3. Standard Score - Draw-A-Man	.449	.139	1.000	.333	.221	.136	-.038	-.224
4. Social Competence Score	-.132	.054	.333	1.000	-.677*	-.684*	.089	-.488
5. Teacher Ranking - Verbal	.160	-.058	.221	-.677*	1.000	.782*	.044	.633*
6. Teacher Ranking - IQ	.195	.177	.136	-.684*	.782*	1.000	-.170	.719*
7. IQ Rank - Posttest PPVT	.095	-.938*	-.038	.089	.044	-.170	1.000	-.388
8. IQ Change - PPVT	-.098	.374	-.224	-.488	.633*	.719*	-.388	1.000

[1]All scores are post scores, for 10-13 children.

*significant at standard z values greater than 1.96, if Alpha is .05.

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Table No. 13

Experimental Groups:

Three classes combined, five variables, means and standard deviations, by sex, 1967-68, Central Harlem, New York City.[1]

Variable	Sex					
	Male			Female		
	N	Mean	SD	N	Mean	SD
1. Percent Attendance	22	76.0	14.6	19	78.5	15.4
2. Post IQ - PPVT	22	87.2	18.5	19	86.0	18.2
3. Post Standard Score, Draw-A-Man	20	91.2	19.8	17	90.5	20.6
4. Social Competence Score	22	79.2	17.0	19	88.8	15.8
5. PPVT - IQ Change	22	14.5	14.9	19	19.7	15.0

[1] Fourth experimental class omitted because of lack of social competence scores.

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Table No. 14

Experimental and Comparison Groups Combined:

Twelve variables by sex, number of children, means and standard deviations, six classes, three schools, 1967-68, Central Harlem, New York City.

Variables	Total-All Groups			Male - All Groups Combined			Female - All Groups Combined		
	N	Mean	SD	N	Mean	SD	N	Mean	SD
1. Days present to 1 May 1968	91	98.4	16.6	47	98.6	16.5	44	98.2	16.7
2. Age in months as of 10-1-67	102	50.9	3.7	52	49.9	3.5	50	51.9	3.7
Pretest, PPVT									
3. CA	102	53.0	3.7	52	52.2	3.3	50	53.8	3.9
4. MA	102	36.3	8.0	52	36.6	9.2	50	35.9	6.6
5. IQ	102	69.3	17.1	52	70.5	16.4	50	68.1	15.7
6. Percentile	71	12.8	12.7	36	13.3	15.6	35	10.3	8.4
7. Raw score	102	27.9	9.8	52	27.8	11.0	50	28.1	8.4
Posttest PIVT									
8. CA	102	59.1	3.8	52	58.1	3.6	50	60.2	3.8
9. MA	102	49.0	12.4	52	47.9	13.2	50	50.3	11.5
10. Percentile	96	27.4	25.7	47	28.1	26.7	49	26.8	24.8
11. Raw score	102	39.9	10.3	52	38.6	11.4	50	41.3	9.0
12. Draw-A-Man Percentile	92	23.0	28.7	47	21.6	28.6	45	24.4	29.1

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Table No. 15

Experimental and Comparison Groups: Range of scores on PPVT, pretests and posttests, and Goodenough Draw-A-Man Test, and number of children in each group above and below specified scores.

Scores	Experimental Classes, n=					Comparison Groups	
	Total Experimental Group n=55	Class 1 (n=15)	2 (n=14)	3(n=13)	4(n=13)	1(n=23)	2(n=23)
PPVT: Range							
Pretest IQ	35-104	39-97	35-98	46-90	43-104	38-92	34-100
Posttest IQ	43-119	55-115	45-119	53-108	43-104	57-115	43-109
PPVT: No. of scores of 85 or above							
Pretest IQ	10	5	3	1	1	5	4
Posttest IQ	32	10	8	7	7	12	10
PPVT: No of "unscorable" scores							
Pretest IQ	12	4	2	4	2	4	7
Posttest IQ	5	1	1	2	1	0	3
Goodenough D-A-M test							
Range of scores	57-135	64-135	57-89	61-128	57-111	57-128	61-111
Scores of 100 or above	13	5	0	3	5	3	1

SUMMARY OF SPEECH AND LANGUAGE ANALYSIS

by

Seymour Rigrodsky and Eleanor Morrison

Analysis of speech sound development, sentence structure, and word associations would indicate that, as a group , the children in the present study are developing speech in accordance with available published norms for lower socio-economic groups. Some of the analysis, particularly the sentence structure evaluation, indicates that some of the children in the present study were performing as well as, or better than children from upper socio-economic groups. The limitations of existing norms prevent comparisons between some of these results and published data. For example, there is no information which indicates the percentage of any population which is expected to meet the norms for a group. The results of the analysis of auditory discrimination suggest that a need exists to develop a program which will teach young children to become proficient in speech sound discrimination.

An attempt was made to give the Illinois Test of Psycholinguistic Ability. However, several factors prevented the experimenters from completing more than a few tests. It was found that it was extremely difficult to maintain attention for a sustained period of time with four-year-old children. The complete test required at least one hour to administer and few children, therefore, were able to complete the entire battery. Further, limitations of space for testing the children within their school environment necessitated their being transported to a facility which was more conducive to individual and prolonged testing. The limitations of the I.T.P.A: will probably preclude its further use with this population.

Detailed data analyses follow, based on data secured through the Templin-Darley Fifty-Item Articulation Screening Test, the Wepman Auditory Discrimination Test, word association test and analyses of tape recorded language samples.

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I. Templin - Darley Fifty - item Articulation Screening Test.

Forty-eight children were given the Templin-Darley screening test, which is a measure of adequacy of articulation at different age levels. Of the 48 children who were tested, 28 children were between 4 years and 4 years 5 months (group A) and 20 children were between 4 years 6 months and 4 years 11 months of age (group B).

Comparison between Templin - Darley norms and results of present sample.

Templin and Darley present mean scores for the screening test which are based upon age, sex, and socio-economic status.

In the present sample, the mean score (number of correct articulatory responses) for the 4 year old group (group A) was 33.03. Compared to the Templin-Darley mean (33.2) for 4 years (both sexes) lower socio-economic status, the present sample of 4 year olds fell .17 below the Templin-Darley mean. The mean score for the four and one half year old group (group B) was 35.1 which is .5 above the Templin-Darley mean (34.6) for four and one half years (both sexes) lower socio-economic status. The mean score for the total sample in the present study was 33.9. (Table I)

The range of scores in the present sample was from 11 correct articulatory responses to 48 correct responses (out of a possible score of 50). In the four year old group (group A) 16 children scored above the Templin-Darley mean, 2 children scored at the Templin-Darley mean, and 10 children scored below the mean. In the four and one half year old group (group B) 14 children scored above the Templin-Darley mean, 1 child scored at the mean, and 5 children scored below the mean. (Table II)

In addition to the various mean scores presented by Templin and Darley, they established "cut-off" scores for each age level. Scores below the cut-off scores are considered to be indicative of "inadequate articulation." Eighty-one percent of the children in the present sample scored above the cut-off scores for their ages.

Nine children (nineteen percent) in the present study scored below the cut-off score and would, therefore, be considered to have inadequate articulation. Of these 9 children, 5 were in the four year old group and 4 were in the four and one half year old group. One of the 9 children (4 years 7 months) had a score of 24 correct responses which is above the four year old cut-off score (23) but below the four and one half year old cut-off (26). All of the other children had scores well below the four year old cut-off; scores ranged between 11 correct to 20 correct responses.

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Table I

Experimental Classes: Templin-Darley Articulation
Age and number correct responses with T-D norms (lower socioeconomic class),
1967-68, Central Harlem, New York City

Subject #	Age	Number Correct Responses	Sex	Below Cut-off = *	T-D Mean Socio-Economic Class & Age	Above T-D S-E Class & Age Mean = +
(4 yr old sample - Mean - 33.03				T-D Mean - 33.2)		
1	4.0	35	F		33.2	+
2	4.2	19	M	*		
3	4.2	13	M	*		
5	4.3	39	F			+
6	4.2	41	M			+
8	4.1	14	M	*		
9	4.0	33	F			=
13	4.2	36	F			+
14	4.3	31	M			
16	4.3	18	F	*		
18	4.3	43	M			+
20	4.5	39	M			+
23	4.0	30	M			
25	4.3	39	F			+
27	4.5	39	M			+
28	4.4	39	F			+
30	4.5	39	F			+
31	4.1	18	M	*		
33	4.0	30	M			
37	4.5	44	M			+
38	4.4	39	F			+
40	4.1	35	F			+
41	4.3	25	F			
43	4.3	43	M			+
44	4.0	48	F			+
45	4.4	33	F			=
46	4.4	26	F			
48	4.3	39	F			+

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Table I (continued)

Experimental Classes: Templin-Darley Articulation
Age and number correct responses with T-D norms (lower socioeconomic class), 1967-68, Central Harlem, New York City.

Subject #	Age	Number Correct Responses	Sex	Below Cut-off = *	T-D Mean Socio-Economic Class & Age	Above T-D S-E Class & Age Mean = +
(4½ yr old sample - Mean - 35.1			T-D Mean--8 Male 1 Female-- 34.6)			
4	4.8	37	F		34.6	+
7	4.7	46	M			+
10	4.11	36	F			+
11	4.7	39	M			+
12	4.7	40	F			+
15	4.9	39	F			+
17	4.7	24	M	*		
19	4.6	44	F			+
21	4.9	45	F			+
22	4.6	34	F			=
24	4.8	43	M			+
26	4.8	13	M	*		
29	4.10	37	M			+
32	4.6	42	M			+
34	4.11	43	F			+
35	4.7	20	M	*		
39	4.10	31	F			
42	4.9	11	M	*		
47	4.10	47	M			+
49	4.7	39	M			+

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Table II

Experimental Classes: Templin-Darley Articulation
Frequency Distribution - Total number correct responses by age and sex, 1967-68, Central Harlem, New York City

Number Correct Responses	4.11	4.10	4.9	4.8	4.7	4.6	4.5	4.4	4.3	4.2	4.1	4.0	----Age
	M - F	M - F	M - F	M - F	M - F	M - F	M - F	M - F	M - F	M - F	M - F	M - F	----Sex
N =	0 - 2	2 - 1	1 - 2	2 - 2	5 - 1	1 - 1	4 - 2	0 - 4	2 - 4	3 - 1	2 - 1	3 - 3	Total
48												-1	1
47		1-											1
46					1-								1
45			-1				1-						2
44				1-			1-						2
43	-1			-1					1-				3
42						1-							1
41										1-			1
40					-1								1
39					1-		2 - 2	-1	-2				0
37		1-		-1									2
36	-1									-1			2
35			-1		1-			-1			-1	-1	5
34						-1							1
33								-1				-1	2
31		-1							1-				2
30												2-	2
26						*		-1					1
25									-1				1
24					1-		**						1
20					1-								1
19										1-			1
18									-1		1-		2
14											1-		1
13				1-						1-			2
11			1-										1
0												1-(no resp. elicited)	1

* Cut-off score 4½ yrs.
** Cut-off score 4 yrs.

The mean scores obtained in the present sample are comparable with the Templin-Darley standarized scores for lower socioeconomic groups. It should be noted that the scores for lower socioeconomic groups studied by Templin and Darley were lower than those found for upper socioeconomic groups, and the same results were found in the present sample.

The majority of the children in this study were found to have adequate articulation as defined by the Templin-Darley cut-off scores for articulatory adequacy. Since there are no available standarized data, it is difficult to determine the significance of socioeconomic status to the development of adequate articulation. On the basis of the similarity found between this group and the standarized mean scores, it is probable that a similar percentage of children in any population of this age would be found to have scores below the Templin-Darley cut-off scores.

Analysis of phonemes tested in the 50-item screening test.

Analysis of the articulatory responses of the children in the present sample revealed that the most severely defective sound tested was the voiced "th" in final position. Forty children, or 5/6 of the total group, did not produce it correctly. The next most severely defective sound was the voiceless "th" in both medial and final positions (37 children, or 3/4 of the total group, did not produce it correctly). (Table III)

Conversely, the least defective sound was found to be (l) in initial position, (47 children, or 98 per cent of the total group, were able to produce this sound correctly); and the (r) phoneme in initial and medial position was the next least defective sound which was tested. (Table IV)

The most common type of error in all three positions was the substitution of one phoneme for another. In initial and final positions, it was more common for the children to omit a sound than to distort it; in medial position the errors were equally divided between omissions and distortions. (Table V)

The position of the sound which caused the greatest difficulty was final position: 53 per cent of all sounds tested in this position were defective, 30 per cent of all initial sounds, and 28 per cent of all medial sounds were defective.

The phonemic analysis would indicate that the pattern of speech sound production, e.g. the higher incidence of substitutions and omissions in contrast to distortions, is similar to that found in the literature discribing the speech of young children.

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Table III

Experimental Classes: Templin-Darley Articulation
Rank order of most defective sounds,
1967-68, Central Harlem, New York City

Sound (phonetics)	Rank Order	No. Children who Produced Sound Incorrectly	Sound (phonetics)	Rank Order	No. Children who Produced Sound Incorrectly
_ ɹ	1	40	ɹʌ _	25.5	14
_ ð	2.5	37	ʃ _	28	10
_ ð _	2.5	37	ʃɹ _	28	10
θɹ _	4	35	ʃɹ _	28	10
ʃɹ _	5	33	_ ʃ	31	9
θ _	6	32	ʌɹ _	31	9
ð _	7	30	ʌɪ _	31	9
ɡɹ _	8	26	ʧʃ _	34.5	8
v _	9	25	ʧɹ _	34.5	8
_ ɣ _	10	23	ɡɹ _	34.5	8
ʒ _	11	22	ʌɯ _	34.5	8
ʃɹ _	12	21	_ ʃ _	38	7
ʃɹ _	13.5	20	_ ʃ	38	7
ɹɯ _	13.5	20	ʃɹ _	38	7
ɹɪ _	16.5	18	ʌɪ _	40	6
ɹʌ _	16.5	18	_ ʒ _	42	5
ɹ _	16.5	18	ʤ _	42	5
ɹʌɪ _	16.5	18	ɡɹ _	42	5
ɹɹ _	20	17	_ v _	45	4
_ ʒ _	20	17	ʃ _	45	4
ɹɡ _	20	17	ʤ _	45	4
ɹʃ _	22.5	16	ɹ _	47.5	3
ʃɯ _	22.5	16	ɹɹ _	47.5	3
_ ʧʃ	24	15	ɹɹ _	49	2
ʧʃ _	25.5	14	ɹ _	50	1

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Table IV

Experimental Classes: Templin-Darley Articulation
Rank Order and Frequency of correct sounds,
1967-68, Central Harlem, New York City.

Sound (Phonetics)	Rank Order	No. Children who Produced Correctly	Sound (Phonetics)	Rank Order	No. Children who Produced Correctly
k-	1	47	-tʃ	26.5	33
gl-	2	46	sk-	26.5	33
r-	3.5	45	sp-	29	31
br-	3.5	45	st-	29	31
-n	5.5	44	tw-	29	31
dʒ-	5.5	44	-ju-	32.5	30
-ŋ	8	43	sm-	32.5	30
-dʒ	8	43	sn-	32.5	30
fr-	8	43	skr-	32.5	30
j-	10.5	42	sl-	35	29
kr-	10.5	42	-ŋ	36.5	28
-ʃ	12.	41	sm-	36.5	28
-tʃ	14.5	40	gl-	38.5	27
tr-	14.5	40	skw-	38.5	27
ʃr-	14.5	40	-z	40	26
fl-	14.5	40	-v	41	23
-ʃ	18.5	39	-ð	42	22
-j	18.5	39	-θ	43	21
-w	18.5	39	-ʒ	44.5	16
-ks	18.5	39	-ð	44.5	16
ʃ-	22.5	38	ʃr-	46	15
gl-	22.5	38	θr-	47	12
fl-	22.5	38	-θ	48	11
kw-	22.5	38	-θ	49	10
-tʃ	[illegible]	[illegible]	-ð	50	6

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Table V

Experimental Classes: Templin Darley Articulation

Distribution of Type of Error by Position
1967-68, Central Harlem, New York City

Type of Error	Initial Position (n=1728)[1]	Medial Position (n=480)[2]	Final Position (n=192)[3]	To Total (n=2400)[4]
Substitution	331	101	75	507
Omission	113	16	19	148
Distortion	63	18	7	88
Addition	7	1	0	8
No Responses	(13)	(7)	(2)	(22)
Total number of Incorrect Responses	514 = 30% of initial sounds inc.	136 = 28% of medial sounds inc.	101 = 53% of final sounds inc.	751 =

[1] 48 children x 36 initial sounds tested = 1728

[2] 48 children x 10 medial sounds tested = 480

[3] 48 children x 4 final sounds tested = 192

[4] 48 children x 50 words in Screening Test = 2400

Additional Analysis

Although all sounds in all positions were not tested in the 50-item screening test, an additional analysis was made of those sounds which do occur in the test and for which there is normative developmental data.

Templin [1] studied speech sound development in children and reported the earliest ages at which 75 per cent of the children tested could produce each of the consonants correctly. The results of phoneme production in the present sample were compared to the speech sound developmental norms established by Templin.

Table VI shows the ages at which each sound is expected to be produced correctly and the number of children in the present sample who produced them correctly.

At the 4½ year old level (s), (sh), and (ch) are expected to be produced correctly. In the screening test, the (s) was tested only in blends and only in initial position. Less than 75 per cent of the children could produce these blends correctly. However, (sh) was produced correctly in all positions by more than 75 per cent of the present sample, and (ch) was produced correctly in initial position by more than 75 per cent of the children. (Slightly less than 75 per cent of the children produced it correctly in medial and final position.)

At the 6 year old level (t), (l), (v), and voiceless (th) are expected to be produced correctly and at the 7 year old level voiced (th), (z), (zh), and (j) are expected to be produced correctly. Surprisingly, 98 per cent of the present sample could produce (l) correctly in initial position; 92 per cent could produce (j) in initial position; and 89 per cent could correctly produce (j) in medial position. The (tr) blend in initial position was produced correctly by over 75 per cent of the children but the (tw) blend was not. All other 6 year old and 7 year old sounds were not produced correctly by 75 per cent of the children and (v), voiceless (th) and voiced (th) were produced correctly by less than 50 per cent of the children.

In general, the distribution of the percentage of children who produced sounds correctly is consistent with the Templin findings.

[1] Mildred C. Templin, Certain Language Skills in Children (Institute of Child Welfare Monograph Series, No. 26), Minneapolis; Univ. Minnesota Press, 1957.

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Table VI

Experimental Classes: Templin - Darley Articulation
Preschool results according to developmental norms

Age Level, Years[1]	Sound	# Correct Responses (N = 48)[2] I	M	F	Blends
	m	--	--	--	
	n	--	--	--	
	ŋ	--	--	--	
3.0	p	*	--	--	(pr) = 46 (pl) = 40
	f	*	--	--	(fr) = 43 (fl) = 40
	h	--	--	--	
	w	--	--	--	
3.5	j	42	39	--	
	b	*	--	--	(br) = 45
	d	*	--	--	(dr) = 39
4.0	k	*	--	--	(kr) = 42 (kl) = 39 (kw) = 38
	g	*	--	--	(gr) = 38 (gl) = 38
	r	49	44	--	
	s	*	--	--	(sk) = 33 (sh)(sw)(skr) = 30 (sm) = 28 (sp)(st) = 31 (sl) = 29 (spr)(str) = 27 (spl) = 21
4.5	ʃ	38	41	39	
	tʃ	40	34	33	
	t	*	--	--	(tr) = 40 (tw) = 31
	l	47	--	--	
6.0	v	23	--	--	
	θ	16	11	10	
	ð	16	22	6	
	z	26	--	--	
7.0	ʒ	--	28	--	
	dʒ	44	43	--	

* sound tested in blends only

[1] Earliest levels at which 75% of children tested by Templin articulated sounds correctly.

[2] For the present sample 36 children = 75%.

II. Wepman Auditory Discrimination Test

Forty-eight children were given the Wepman Auditory Discrimination test, which is a measure of the child's ability to discriminate between word-pairs which are presented orally. Of the 48 children who were tested, 26 children were between 4 years 6 months and 4 years 11 months and 22 children were between 5 years and 5 years 6 months of age.

Comparison between Wepman norms and results of the present sample

Wepman presents norms which begin at the 5 year old level, and are based upon the number of errors a child makes in discriminating between different word-pairs. At the 5 year old level, a child who makes more than six errors is considered to have poor auditory speech sound discrimination.

Only twenty-one per cent of the present sample had normal auditory discrimination according to the Wepman norms: 6 children in the five year old group and 4 children in the below-five year old group.

The scores in the present sample ranged from one incorrect response to 23 incorrect responses. The range of scores for the 5 year old group was from one to 19 incorrect responses; the range for the below-five year old group was from two to 23 incorrect responses (Table VII)

It would appear that little difference exists between the two age groups in relation to auditory discrimination results for the Wepman test.

It should be noted that Wepman states that scores greater than 15 should not be counted. Four children had scores greater than 15 (2 in the 5 year old group and 2 in the below-five year old group) and 3 children had scores of exactly 15 (2 children in the 5 year old group and 1 child in the below-five year old group). These seven children were not eliminated from the study.

Analysis of defectiveness of phonemes tested

The Wepman test employs two forms of the test which are supposed to be used interchangeably. However, when the results are compared, differences in the number of errors made for certain phonemes are evident. These differences are probably a function of words which are influenced by Negro dialect. For example, distinction between "e" and "i" on Form I (pen - pin) was missed by 19 of the 33 children who were given this form of the test, whereas only 1 child of the 16 children who were given the Form II test missed the same sound distinction (pet - pit).

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Table VII

Experimental Classes: Wepman Auditory Discrimination X-Scores[1] by age of child, 1967-68, Central Harlem, New York City.

Subject Number	Age	X Score	* = within Norm	Subject Number	Age	X Score	* = within Norm.
1	5.6	7		37	4.11	6	*
10	5.6	15		30	4.11	9	
				48	4.11	10	
59	5.5	5	*	43	4.11	11	
61	5.5	9					
57	5.5	10		28	4.10	6	*
34	5.5	13		38	4.10	7	
				14	4.10	7	
47	5.4	10		25	4.10	7	
52	5.4	11		51	4.10	10	
15	5.4	11		46	4.10	12	
29	5.4	15		16	4.10	13	
24	5.3	8		5	4.10	14	
39	5.3	18		54	4.10	15	
19	5.2	1	*	2	4.9	10	
7	5.2	6	*	6	4.9	11	
11	5.2	7		13	4.9	12	
12	5.2	7		41	4.9	23	
17	5.2	15		8	4.8	7	
22	5.1	2	*	9	4.7	3	*
18	5.1	6	*	40	4.7	10	
49	5.1	19		23	4.7	11	
				31	4.7	16	
36	5.0	6	*				
27	5.0	9		21	4.6	2	*
				60	4.6	10	
N = 22			(6 within Wepman norm for 5 yr.)	56	4.6	10	
				62	4.6	11	
				N = 30			(4 within Wepman norm for 5 yr.)

[1] Norm for 5 year old: X Score = 4 or less errors.

Despite differences found between the two forms, the distinctions between "f" and voiceless "th" and between "v" and voiced "th" in final position were the most commonly defective pairs on both forms (Table VIII)

When the number of errors for each pair of phonemes was tabulated for all the children, regardless of the form of the test which they received, the most defective discriminations were for the distinctions between "f" and voiceless "th" and between "v" and voiced "th" in final position.

With the exception of the "v" and voiced "th" distinction in initial position, the children had the least difficulty in recognizing sound differences at the beginning of the word (Table IX)

Observation of T.VIII reveals that identification of identical word pairs was a far easier task for the children. On Form II no same word pair was missed by more than 1 child, on Form I there was more variation but identical word pairs still caused little difficulty.

Possible explanations for results on Wepman Auditory Discrimination test

The unusual result that 79 per cent of the children in the present sample had, according to the Wepman norms, defective auditory speech sound discrimination might be explained in a few ways.

The sharp difference between the ability of the children to discriminate sound differences at the beginning of words and at the end of words is not surprising. Developmentally, initial sounds are identified and produced earlier than final ones. Further, the dialectal pattern of omission of many final consonants is apparently also influencing the ability to perceive final sounds.

Severity of defectiveness in distinguishing (f-th) and (v-th) in final position can be attributed to the dialect and/or developmental speech pattern. The Templin-Darley articulation test results show that voiced and voiceless (th) in final position were the most severely defective phonemes in the present sample.

It should be noted that, even though this test was given at the end of the school year (June), many children still had difficulty in responding to the task of "same or different" and many of the scores are based upon the child's ability to repeat the 2 stimulus words. (Therefore, auditory discrimination was not tested alone and there could have been possible interference with results due to poor auditory memory span or defective ability in repeating orally.)

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Table VIII

Experimental Classes: Wepman Auditory Discrimination
Rank Order of Sounds Causing Most Difficulty

Number of Subjects Making Error (N=33)	Words		Rank	Position	Form I Sound	Form II Sound	Position	Rank	Words		Number of Subjects Making Error (N=16)
25	sheaf	sheath	1	F	f - θ	θ f	F	1	wreath	reef	14
23	clothe	clove	2	F	v - ð	v - ð	F	2	lave	lathe	11
19	lease	leash	3.5	F	s ʃ	p k	F	3	cope	coke	10
19	pen	pin	3.5	M	ɛ ɪ	f - s	F	4	cuff	cuss	9
18	shake	shape	5.5	F	k - p	g d	F	6	bug	bud	8
18	bum	bomb	5.5	M	ʌ - ɑ	s - θ	F	6	lass	lath	8
17	bass	bath	7	F	s θ	v - ð	I	6	vie	thy	8
16	vow	thou	8.5	I	v - ð	m n	F	9	bum	bun	7
16	pat	pet	8.5	M	æ ɛ	m n	I	9	map	nap	7
13	tub	tug	11.5	F	b - g	s ʃ	F	9	muss	mush	7
13	leg	led	11.5	F	g - d	t p	F	11	shot	shop	6
12	put	pack	11.5	F	t k	d - b	F	13	cad	cab	5
12	dim	din	11.5	F	m n	t k	F	13	lit	lick	5
13	web	wed	14.5	F	b - d	ʃ θ	F	13	rash	wrath	5
13	muff	muss	14.5	F	f s	s - ʃ	I	16	sake	shake	4

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Table VIII (continued)

Experimental Classes: Wepman Auditory Discrimination
Rank order of sounds causing most difficulty

Number of Subjects Making Error (N=33)	Words		Rank	Position	Form I Sound	Form II Sound	Position	Rank	Words		Number of Subjects Making Error (N=16)
12	cat	cap	16	F	t p	b d	I	16	bead	deed	4
11	lath	lash	17	F	θ ʃ	ɔ o	M	16	gall	goal	4
10	shoal	shawl	18	M	o ɔ	ɛ æ	M	19	led	lad	3
9	thread	shred	19	I	θ ʃ	b g	I	19	rub	rug	3
5	tie	thigh	20	I	t θ	f θ	I	19	fret	threat	3
6	shack	sack	21.5	I	ʃ s	p t	I	23	pool	tool	2
5	pork	cork	21.5	I	p k	ʌ ɑ	M	23	suck	sock	2
5	thimble	symbol	23	I	θ s	p k	I	23	pit	kit	2
-	moon	noon	24.5	I	m n	g d	I	23	guile	dial	2
-	tall	tall	24.5	≠		k t	I	23	cart	tart	2
3	nest	nest	26.5	≠		ɛ ɪ	M	31	pet	pit	1
3	wretch	wretch	26.5	≠		f s	I	31	fag	sag	1
2	lack	lack	30	≠		ɪ θ	I	31	sick	thick	1
2	gut	duck	30	I	g d	θ ʃ	I	31	thief	shief	1
2	bale	gale	30	I	b g		≠	31	ball	ball	1
2	jam	jam	30	≠			≠	31	lake	lake	1
2	coast	toast	30	I	k t		≠	31	zone	zone	1
1	sought	fought	35.5	I	s f		≠	31	bar	bar	1
1	din	bin	35.5	I	d b		≠	31	wedge	wedge	1
1	chap	chap	35.5	≠			≠	31	chew	chew	1
1	badge	badge	35.5	≠			≠	31	phase	phase	1
1	par	par	35.5	≠		g b	I	38.5	gear	beer	0
1	pose	pose	35.5	≠		ʤ	≠	38.5	jail	jail	0
0	tin	pin	39.5	I	t p		≠	38.5	wing	wing	0
0	king	king	39.5	≠			≠	38.5	rich	rich	0

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Table IX

Experimental Classes: Wepman Auditory Discrimination
Rank order from most errors to least errors
(Form I & II combined), 1967-68, Central Harlem, New York City

Sound	Position	Rank
f - v	F	1
v - ð	F	2
k - p	F	3
ʃ - ʧ	F	4
s - z	F	5
v - ɣ	I	6
ʤ - d	F	7
m - n	F	8.5
f - s	F	8.5
ɛ - ɪ	M	11
ʌ - æ	M	11
t - k	F	11
æ - ɛ	M	13
k - g	F	15
b - d	F	15
t - p	F	15
t - ʃ	F	17
[illegible]	M	18
I - ɛ	I	19.5
m - n	I	19.5
ɛ - ʃ	I	21.5
ʃ - s	I	21.5
p - k	I	23
ɛ - æ	I	24
d - b	I	25
ʤ - d	I	26.5
k - t	I	26.5
b - g	I	29
s - ʃ	I	29
t - p	I	29

It cannot be said on the basis of the Wepman Auditory Discrimination test that the children in the present sample were as severely defective as the results would indicate. It is probable that the poor results are a function of the dialectal-articulatory patterns of the children and of their difficulty in dealing with the concept of "same or different" when applied to speech sound distinctions.

III. Word Association Test

Forty-three children were given a word association test in an attempt to measure some aspects of language development. The words were selected from the word list used by Entwisle,[1] who used these words in a cross-sectional study of word associations in children.

The 25 words which were chosen for this test were selected on the following basis: (a) 10 nouns, (b) 8 verbs, (c) 7 adjectives.

Comparison of Idiosyncratic and Commonality responses

In every instance there were more idiosyncratic responses (a response that has been given by only one child) than commonality responses (the tendency of subjects to give a few strong responses to a stimulus word). (Table X)

The total number of commonality responses for any one word does not mean that one common response was given. If more than one child gave the same response to a stimulus word, it was considered to be a commonality response. In some instances, as many as seven different responses were given to a stimulus word which could be considered as a common response. (Table XI)

It should be noted that although 43 children took the Word Association test, the combined number of idiosyncratic and commonality responses do not total 43 for any of the 25 stimulus words. This discrepancy is due to the fact that in each instance there were children who either repeated the stimulus word or gave no response to the stimulus word.

Contrast responses

Of the twenty-five stimulus words, there were 15 words which had possible contrast responses. Twelve of these 15 words elicited at least one contrast response. The word "man" elicited the most contrast responses. (Table XII)

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[1]Doris R. Entwisle, Word Associations of Young Children. Baltimore, Maryland: Johns Hopkins Press, 1966.

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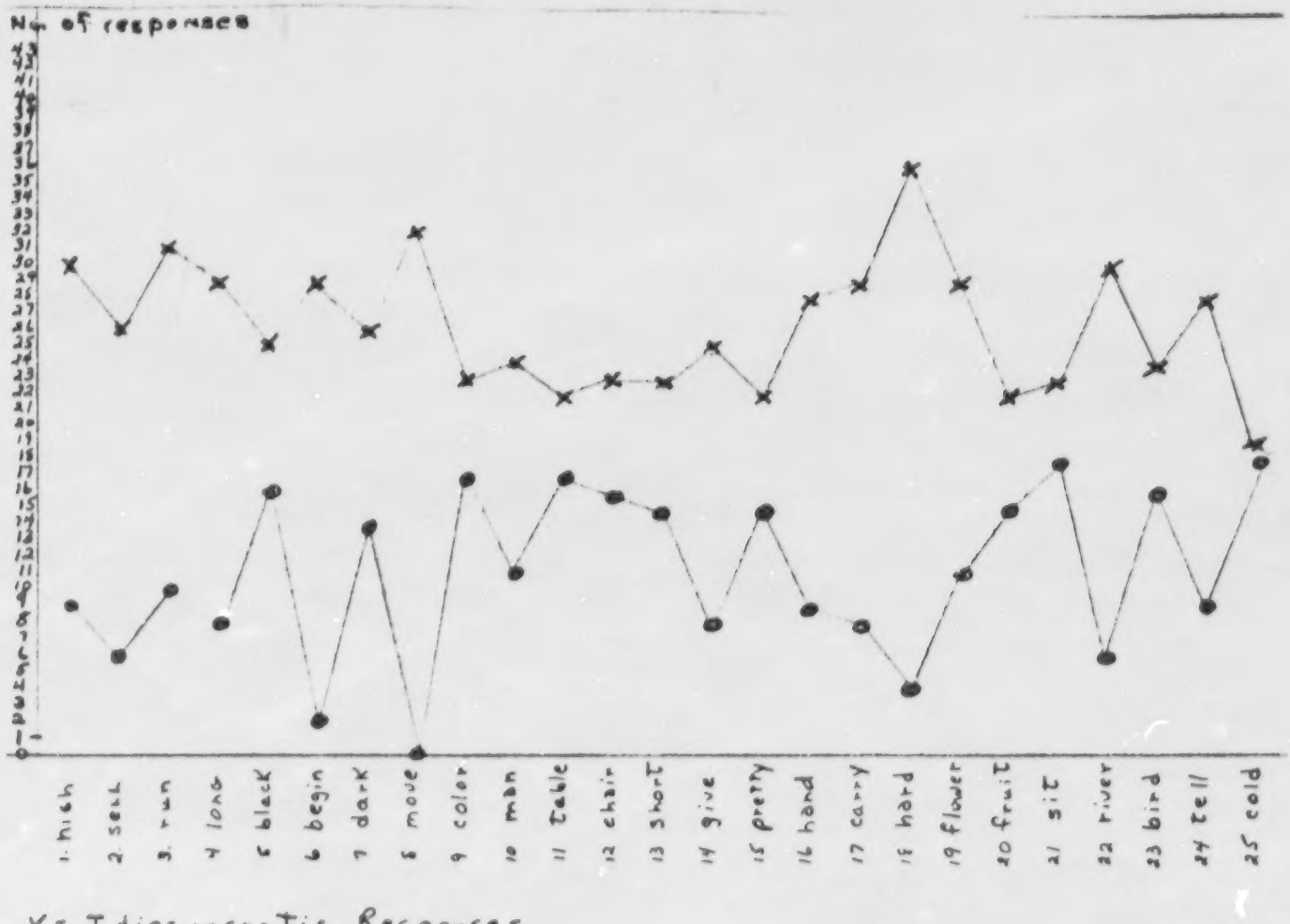
Table X

Experimental Classes: Word Association Test
Frequency of Idiosyncratic and Commonality Responses



X = Idiosyncratic Responses
O = Commonality Responses

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Table XI

Experimental Classes: Word Association Test

Order & Frequency of Commonality Responses

Stimulus	Resp.	#	Resp.	#	Resp.	#	Resp.	#	Resp.	#	Resp.	#	Resp.	#
1. high	eye	7	hello	2	-		-		-		-		-	
2. tall	milk	2	high	2	girl	2	-		-		-		-	
3. run	walk	4	skip	2	house	2	girl	2	-		-		-	
4. long	cord	3	pencil	3	run	2	girl	2	-		-		-	
5. black	green	3	white	3	red	2	orange	2	blue	2	yellow	2	girl	2
6. begin	girl	2	-		-		-		-		-		-	
7. dark	light	5	door	3	dog	2	blue	2	girl	2	-		-	
8. nose	-		-		-		-		-		-		-	
9. color	book	6	black	4	red	3	pink	2	crayon	2	-		-	
10. man	girl	5	boy	4	woman	2	-		-		-		-	
11. table	chair	8	eat	3	plate	2	boy	2	-		-		-	
12. chair	sit	10	table	4	house	2	-		-		-		-	
13. short	pants	5	shorts	3	boy	3	dress	2	little	2	-		-	
14. give	cookie	2	me	2	like	2	talk	2	-		-		-	
15. pretty	dress	6	boy	4	doll	3	white	2	-		-		-	

Table XI

(cont.)

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Stimulus	Resp.	#	Resp.	#	Resp.	#	Resp.	#	Resp.	#	Resp.	#	Resp.	#
16.hand	arm	3	foot	2	shake	2	eat	2	-		-		-	
17.carry	baby	4	carrot	2	boy	2	-		-		-		-	
18.hard	hammer	2	rock	2	-		-		-		-		-	
19.flower	water	4	plant	3	smell	2	food	2	-		-		-	
20.fruit	eat	9	juice	3	orange	3	apple	2	black	2	-		-	
21.sit	down	12	jump	2	stand	2	apple	2	-		-		-	
22.river	water	2	you	2	boy	2	-		-		-		-	
23.bird	fly	10	flying	2	flies	2	trees	2	-		-		-	
24.tell	mommy	3	on mommy	2	tale	2	boy	2	-		-		-	
25.cold	outside	4	out there	2	hot	3	hat	3	stove	2	sun	2	water	2

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Table XII

Experimental Classes: Word Association Test

Contrast Responses

Stimulus	Resp.	#	Resp.	#	Resp.	#
1. high	bye	7	low	1		
2. sell	buy	1				
3. run	walk	4				
4. long	(short)	0				
5. black	white	3				
6. begin	(end)	0				
7. dark	light	5				
8. move	--	-				
9. color	--	-				
10. man	girl	5	woman	2	lady	1
11. table	--	-				
12. chair	--	-				
13. short	long	1				
14. give	(take)	0				
15. pretty	ugly	1				
16. hand	foot	2	leg	1		
17. carry	--	-				
18. hard	soft	1				
19. flower	--	-				

Table XII (cont.)

Stimulus	Resp.	#	Resp.	#	Resp.	#
20. fruit	--	-				
21. sit	stand	2				
22. river	--	-				
23. bird	--	-				
24. tall	--	-				
25. cold	hot	3				

Frequency of multiple-word responses

Unlike older populations who, in response to a stimulus word give a one word response, the present sample tended to give short phrasal responses to the stimuli. In no case did a stimulus word elicit a single word response from all children. Frequently the phrase response was a very appropriate one but in analyzing for word class, commonality, etc., the meaningfulness of the response was lost since the initial word of the response had to be counted (according to Entwisle's rules). Similar findings were reported by Entwisle[1] who noted that "multiple word responses are frequent at the youngest ages and also become more numerous again at the fifth grade." (Table XIII)

Paradigmatic responses and analysis of word-class responses

Analysis of paradigmatic responses (a response which is of the same form class as the stimulus word, without regard for meaningful of association) has been considered to be a sensitive measure of linguistic development. That is, matching responses (nouns in response to nouns, adjectives in response to adjectives, etc.) appear to "increase remarkably with age over childhood."[2]

In the present sample, all words with a high number of paradigmatic responses (20 or more) are nouns. This is not necessarily because nouns tend to elicit nouns, but rather that there was a higher number of noun responses to all stimulus words. The same result was found by Entwisle who explained, "Responses to nouns are hard to interpret. The high number of noun responses to noun stimuli at kindergarten and first grade should probably not be construed as a paradigmatic response pattern, because a verb stimulus or an adjective stimulus is very likely to elicit a noun response also. A noun response is by far the most likely type of response to any stimulus word for preschool children."[3]

When the word class responses to words other than nouns are examined, the results in the present sample are similar to those found by Entwisle in her sample of 20 four year olds. She reported that she found "a degree of orderliness" in the

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[1]Entwisle, page 34, Ibid.

[2]Entwisle, page 59, Ibid.

[3]Entwisle, page 63, Ibid.

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Table XIII

Experimental Classes: Word Association Test

Frequency of Occurence of Multiple Word Responses

Stimulus	Number of Multiple Res.		Number of "C" Res.		Number of Single Res.
1. high	9		2		32
2. sell	7		9		27
3. run	9		3		31
4. long	7		7		29
5. black	7		3		33
6. begin	5		13		25
7. dark	8		4		31
8. move	9		12		22
9. color	14		4		25
10. man	7		8		28
11. table	11		4		28
12. chair	10		4		29
13. short	12		6		27
14. give	10		11		22
15. pretty	8		7		28
16. hand	9		7		27
17. carry	11		7		25
18. hard	9		4		30
19. flower	6		4		33
20. fruit	8		6		29
21. sit	12		2		28
22. river	11		8		24
23. bird	9		3		31
24. tall	11		7		25
25. cold	13		7		23

[1] "C" response = Unclassified Response

e.g. - gave no response, repeated stimulus, etc.

responses.[1] For example, Entwisle reported that 6 per cent of the responses to verbs were adverbs, whereas less than 1 per cent of the responses to nouns or adjectives were adverbs. In the present sample, adverbal responses were infrequent but the greatest number of adverb responses (eleven) were elicited by the verb "sit," and the next highest number of adverb responses (five) were elicited by the verb "run."(Table XIV)

Although Entwisle believed that her results with 4 year olds might be atypical, since the sample was selected from an "affluent suburban area" and their parents "without exception, had at least a college education"[2] the findings in the present sample appear to be similar. A paucity of normative data on word association of prekindergarten children prevent further comparative analysis of the findings.

Implications

On the basis of the results obtained in this year's analysis and the limited data available on word associations of prekindergarten children, it is believed that it would be profitable to continue to study word associations, particularly from a longitudinal point of view, in order to determine language development in young children from culturally disadvantaged environments.

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[1]Entwisle, page 55, Ibid.

[2]Entwisle, page 66, Ibid.

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Table XIV

Experimental Classes: Word Association Test

Paradigmatic and Other Word Class Responses

Stimulus	Stim. Word Class	Paradigmatic Response N=43			Can't Let. Stim.	Noun.	Verb	Adj.	Adv.	Pron.	Prep.	Conj.	Inc.	(0)
1.high	Adj.-N	15	Adj.-4	N-11	(19)	20	2	9	2	1	1	-	-	8
2.sell	V	1				25	1	6	-	-	1	-	1	10
3.run	V	9				18	9	4	2	2	2	1	-	6
4.long	Adj.	3				21	12	3	-	-	1	-	-	7
5.black	Adj.	15				19	4	15	2	1	-	-	-	3
6.begin	V	7				15	7	5	1	1	-	-	2	12
7.dark	Adj.	15				22	3	15	-	-	-	-	-	4
8.move	V	8				14	8	2	3	1	2	-	2	12
9.color	N-V	3	N=1	V=2	(7)	7	3	18	-	1	1	1	-	4
10.man	N	27				27	4	-	-	3	-	-	-	9
11.table	N	27				27	8	2	-	2	1	-	-	4
12.chair	N	22				22	11	4	-	1	2	-	-	4

CUE Pre-K Study of Intellectual Stimulation (cont.)
Page 2

Stimulus	Stim. Word Class	Paradigmatic Response N=43	Can't Det. Stim.	Noun	Verb	Adj.	Adv.	Pron.	Prep.	Conj.	Int.	(C)
13.short	Adj.	4		26	4	4	1	-	2	-	1	0
14.give	V	7		19	7	2	1	-	-	-	1	11
15.pretty	Adj.	7		22	2	7	3	2	1	-	1	0
16.hand	N	23		23	8	3	1	2	-	-	-	7
17.carry	V	5		47	3	2	-	1	1	1	-	7
18.hard	Adj.	2		33	3	2	1	-	-	-	-	2
19.flower	N	26		26	5	5	-	2	1	-	1	4
20.fruit	N	22		22	9	5	-	1	-	-	-	1
21. sit	V	0		17	0	4	11	-	-	-	-	4
22.diver	N	21		21	8	2	1	-	-	-	-	6
23.bird	N	23		23	15	2	-	-	-	-	-	4
24.roll	V	5		24	5	3	-	2	3	-	-	7
25.cold	Adj.	8		21	4	8	-	-	1	-	1	6

IV. Analysis of tape-recorded Language Sample

A speech sample, consisting of a series of utterances during interactionwith an adult, was obtained from twenty-seven children in the present study. Of these 27 children, 22 were between 5 years and 5 years 3 months and 5 were between 4 years 6 months and 4 years 11 months. (A speech sample of 21 children in the control schools was also obtained, but analysis of these samples will not be included in this report since no data are available for these children.)

Each utterance in the sample was submitted to three types of analysis. One type was 'structural,' to evaluate the complexity of grammatical usage. The second type was 'functional,' to assess the maturity of purpose for communication. The third type of analysis was 'measures of verbal output,' in which the number of different words used by each speaker and the average length of each speaker's response, were computed.

Group means were computed for each category of response for age groups four and one half years and five years. They are presented in the tables which follow. These group means were compared with norms reported in the literature for children of the same ages. Where possible, comparisons were made to groups designed as 'lower socioeconomic status.' The tables show these comparisons. In addition, comparison norms for five and one half or six years are provided. The percentage of the present group performing below published norms for their ages also have been found for each category of the analysis. These percentages appear in the tables. Group ranges of scores for each category are also presented. The wide ranges for most categories should be noted.

In many areas of language, the present subjects performed as well as, and sometimes better than children in the same age groups who made up normative groups reported in the literature. In the following areas, the children in the present group were markedly superior to the normative groups: 'structural'-- the per cent of compound and complex sentences used; and the per cent of elaborate sentences used; 'functional'-- the per cent of utterances employing 'adapted information.' In the following areas, these children did not perform as well as the comparison groups: 'functional' -- the per cent of questions asked; and, in 'measures of verbal output'-- the number of different words used.

In evaluating these results, however, several factors about the present procedures and the comparison norms must be remembered: 1) The comparison norms were based on 50-utterance samples. The present samples are considerably shorter. 2) It was not possible to know the exact procedures of the comparison studies for comparison with our own. 3) Within each age group, the comparison studies were selected for all categories on the basis of their similarity to the present one. Therefore, the sources of comparison do vary from one age group to another. In addition, the degree of similarity to this study was often difficult to determine.

In summary, then, the children in the present sample spoke as much and, in several important respects, at the same levels of grammatical complexity, as children of similar ages during similar periods of verbal interaction. Further, in several important respects, they used language as purposefully as did the comparison groups. Their vocabularies, however, were smaller during the period of observation than the comparison children's; in addition, they asked fewer questions.

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Experimental Classes
Table XV

MEASURES OF VERBAL OUTPUT
Age 4½ years: N = 5
Age 5 years: N = 22

Number of different words

Ages	Present Group: Range	Present Group: Means	Published Norms: 4.5 & 5.0	% Below Published Norms
4.5	(60-93)	77.4	123.0	100%
5.0	(42-131)	89.7	128.6	95%

One-word responses

Ages	Present Group: Range	Present Group: Means	Published Norms: 4.5 & 5.0	% Below Published Norms	Published Norms: 6.0
4.5	(0-3)	.6	2.6	20%	
5.0	(0-3)	.6	2.2	10%	.7

Mean Length of Response

Ages	Present Group: Range	Present Group: Means	Published Norms: 4.5 & 5.0	% Below Published Norms	Published Norms: 6.0
4.5	(4.4 - 13.7)	8.9	5.5	20%	
5.0	(3.87 - 15.9)	8.9	5.7	15%	6.6

Mean Length of 5 Longest Responses

Ages	Present Group: Range	Present Group: Means	Published Norms: 4.5 & 5.0	% Below Published Norms	Published Norms: 6.0
4.5	(10.0-28.5)	16.3	10.28	20%	
5.0	(6.8 - 35.0)	17.7	11.36	25%	11.91

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Experimental Classes

FUNCTIONAL ANALYSIS OF SENTENCES

Age 4½ years: N = 5
Age 5 years: N = 22

Number of sentences

Ages	Present Group: Ranges	Present Group: Means
4.5	(10-25)	22.0
5.0	(10-25)	23.6

% Egocentric

Ages	Present Group: Ranges	Present Group: Means	Published Norms: 4.5 & 5.0	% Below Published Norms	Published Norms: 5.5
4.5	(0-82)	16.4	2.2	20%*	
5.0	(0-28)	8.7	26.0	15%*	.4

% Adapted Information

Ages	Present Group: Ranges	Present Group: Means	Published Norms: 4.5 & 5.0	% Below Published Norms	Published Norms: 5.5
4.5	(12-90)	58.8	54.6	40%	
5.0	(19-88)	67.1	25.0	5%	59.7

% Emotionally Toned

Ages	Present Group: Ranges	Present Group: Means	Published Norms: 4.5 & 5.0	% Below Published Norms	Published Norms: 5.5
4.5-	(0)	0	6.4	100%	
5.0	(0-4)	.36	22.0	100%	3.8

* The Ss having more of these responses than the published norms were considered below the norms.

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Experimental Classes

FUNCTIONAL ANALYSIS OF SENTENCES, continued

% Questions

Ages	Present Group: Ranges	Present Group: Means	Published Norms: 4.5 & 5.0	% Below Published Norms	Published Norms: 5.5
4.5	(0-4)	1.6	8.2	100%	
5.0	(0-32)	2.7	16.0	90%	10.6

% Answers

Ages	Present Group: Ranges	Present Group: Means	Published Norms: 4.5 & 5.0	% Below Published Norms	Published Norms: 5.5
4.5	(8-64)	23.6	26.0	80%	
5.0	(8-81)	26.5	7.0	—	25.6

STRUCTURAL ANALYSIS OF RESPONSES*
Age 4½ years: N = 5
Age 5 years: N = 22

Number of responses

Ages	Present Group: Ranges	Present Group: Means
4.5	(10-25)	22.0
5.0	(10-25)	24.8

% Functionally Incomplete

Ages	Present Group: Ranges	Present Group: Means	Published Norms: 4.5 & 5.0	% Below Published Norms	Published Norms: 6.0
4.5	(0-4)	1.6	12.1	100%*	
5.0	(0-28)	5.6	12.6	90%*	8.6

STRUCTURAL ANALYSIS OF RESPONSES, continued

% Structurally Incomplete, Functionally Complete

Ages	Present Group: Ranges	Present Group: Means	Published Norms: 4.5 & 5.0	% Below Published Norms	Published Norms: 6.0
4.5	(0-52)	18.4	19.5	20%*	
5.0	(0-62)	15.4	17.2	75%*	9.8

% Simple Sentence, No Phrase

Ages	Present Group: Ranges	Present Group: Means	Published Norms: 4.5 & 5.0	% Below Published Norms	Published Norms: 6.0
4.5	(0-48)	31.6	37.6	20%*	
5.0	(12-68)	34.7	35.8	55%*	38.2

% Simple Sentence, Compound Object, Subject, or Predicate

Ages	Present Group: Ranges	Present Group: Means	Published Norms: 4.5 & 5.0	% Below Published Norms	Published Norms: 6.0
4.5	(0-12)	5.6	12.1	100%*	
5.0	(4.24)	11.8	16.8	85%*	20.7

% Compound & Complex Sentences

Ages	Present Group: Ranges	Present Group: Means	Published Norms: 4.5 & 5.0	% Below Published Norms	Published Norms: 6.0
4.5	(0-90)	33.2	6.8	60%	
5.0	(0-52)	19.7	8.7	30%	10.8

% Elaborate Sentences

Ages	Present Group: Ranges	Present Group: Means	Published Norms: 4.5 & 5.0	% Below Published Norms	Published Norms: 6.0
4.5	(0-20)	8.0	7.5	60%	
5.0	(0-48)	14.6	8.1	55%	11.9

* Some Ss who were below published norms for simpler grammatical constructions were above norms for more complex constructions.